

**PATENT COOPERATION TREATY**

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**PCT**

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(54) Title: LEWIS ACID IONIC LIQUIDS

(57) Abstract: The present inventions relate to novel ionic liquids comprising a Lewis acid anion such as  $Al_yR_{3y+1}$  wherein y is greater than 0 and R is independently selected from the group consisting of an alkyl group and halogen group. The cation of the ionic liquids can be selected from ammonium, sulfonium, and phosphonium cations wherein said cation generally has less than 14 total carbon atoms. The anion may contain an organic bridge to bond neighboring aluminum atoms that would otherwise be susceptible to leaching aluminum trichloride. The ionic liquids are useful in many applications and particularly as catalysts.

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/25816

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C07F 5/06

US CL : 556/174, 178, 180, 186

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 556/174, 178, 180, 186

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
REGISTRY and CAPLUS Databases

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WESTMORELAND, Jr. et al., Journal Organometallic Chemistry, December 1970, Vol. 25, No. 2, pages 329-335, especially Table 1 at page 331.	1-3, 11-13
X	SYMMES, Jr. et al., Journal of Organic Chemistry, 1978, Vol. 43, No. 6, pages 1250-1253, especially compound 2 at page 1251.	1, 3, 17
X	GB 1,031,839 (FARBENFABRIKEN BAYER AKTIENGESELLSCHAFT) 2 June 1966, pages 2 and 3.	1, 3, 17
X	US 4,857,238 A (TSUCHIYA et al.) 15 August 1989, column 7, lines 1-17.	1, 3, 11, 12
X	US 3,418,216 A (DOTZER RICHARD) 24 December 1968, see Tables I-III at columns 3 and 5.	1, 2, 11

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

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